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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,896	03/31/2004	Clifford Earl Shamblen	129964/11863 (21635-0121)	7593
31450	7590	10/19/2006	EXAMINER	
MCNEES WALLACE & NURICK LLC 100 PINE STREET P.O. BOX 1166 HARRISBURG, PA 17108-1166			ZHU, WEIPING	
			ART UNIT	PAPER NUMBER
			1742	

DATE MAILED: 10/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/814,896	SHAMBLEN ET AL.	
	Examiner	Art Unit	
	Weiping Zhu	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 06 October 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 13, "the step of melting and solidifying" lacks antecedent basis.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4-7, 9, 11, 12, 14-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Japanese patent 57-164958.

With respect to claims 1, 2, 4-6, 11, 12, 14, 21-23, JP '958 discloses (claim 1) a method for manufacturing a sintered high-alloy steel having a structure in which a fine carbide is uniformly dispersed in a martensitic iron alloy matrix, comprising:

mixing and pulverizing a compound metal oxide powder and carbon powder to form a compound mixture;

reducing said compound mixture in a hydrogen flow while being alloyed to obtain an alloy powder;

compacting and vacuum sintering said alloy powder;

compressing isotropically the sintered compact in an inert gas atmosphere;

heat-treating the compressed compact to render the matrix martensite.

JP '958 discloses in working example (1) (page 13) iron oxide is used as the precursor of the base metal and oxides of the alloying elements are used as the precursors of the alloying elements as in the instant claims 1, 4, 6 and 14.

JP '958 discloses that W, Mo, Cr, V, Co, Ti, Nb, Ta, C and N are used as alloying elements (2<sup>nd</sup> paragraph, page 7), which are the same as disclosed in the instant disclosure. It would be inherently that at least one of these alloying elements disclosed by JP '958 would be thermophysically melt incompatible as in the instant claims 1 and 14 or compatible as in the instant claims 5 and 23 with the base metal Fe depending on its composition and the extent of the differences between its melting temperature, density, vapor pressure and other properties and those of the base metal.

JP '958 discloses that the sintering temperature is generally 30° C to 70° C below the solid phase line (last paragraph, page 11); there is no liquid phase reaction from the creation of the alloy powder to the completion of the finished product. It is solid phase reaction all the way through to the end. (last paragraph, page 18). It would be inherently that the entire process of JP '958 to be performed without melting as in the instant claims 1 and 14.

With respect to claims 7 and 9, JP '958 discloses an amount of carbon for reducing the metal oxide as CO is added in powder form and heat is applied in a hydrogen flow to co-reduce the oxide with the hydrogen and carbon (claim 1). Because

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there is no melting in the entire process of JP '958 as discussed above, the reactions between said carbon powder and said metal oxide in JP '958 would be in solid state. The reduction of the metal oxide by a heated hydrogen flow in JP '958 would be vapor phase reduction.

With respect to claims 15 and 19 JP '958 discloses Mn is contained in the alloying elements as an impurity (last paragraph, page 13). It would be inherently that the vapor pressure of Mn is about 10 times greater than that of base iron metal at a melt temperature and that Mn exhibits a miscibility gap with the iron base metal.

With respect to claim 16, JP '958 discloses that W, Mo and Ta are used as alloying elements (2<sup>nd</sup> paragraph, page 7), which are the same as disclosed in the instant disclosure. It would be inherently that the melting temperature of W, Mo and Ta are more than 400° C higher than that of iron.

With respect to claim 17, JP '958 discloses that Ta, W and Nb are used as alloying elements (2<sup>nd</sup> paragraph, page 7), which are the same as disclosed in the instant disclosure. It would be inherently that differences in density between Ta, W, Nb and base iron metal are greater than about 0.5 gram per cubic centimeter.

With respect to claim 18, JP '958 discloses that Ta is used as alloying elements (2<sup>nd</sup> paragraph, page 7). It would be inherently that Ta chemically reacts with the base iron metal in the liquid phase.

With regard to claim 20, JP '958 discloses the sintering is conducted in vacuum and the isotropical compression is conducted in an inert gas atmosphere (2<sup>nd</sup> paragraph, page 6). It would be inherently in the absence of evidence to the contrary

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that vacuum and inert gas atmosphere are used in JP '958's process to prevent the alloying elements, if melted, from chemically reacting with a melting atmosphere.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '958 and further in view of Fray et al. (WO 99/64638).

JP '958 does not teach the reduction of the oxide with fused salt electrolysis.

Fray (WO '638) discloses a method to remove oxygen from metal oxides and solid solutions by electrolysis in a fused salt (abstract). It would be obvious to one of ordinary skill in the art at the time the invention was made to use fused salt electrolysis as disclosed by Fray (WO '638) in the process of JP '958 to reduce the cost for reduction and refining process as disclosed by Fray (WO '638) (col. 4, lines 23-25):

4. Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '958 and further in view of Armstrong et al. (US Patent No. 5,958,106).

With respect to claims 3 and 10, JP '958 does not teach using iron base metal and alloying elements in gaseous form as in the instant claim 3 and reducing the compound mixture by contacting with a liquid selected from the group consisting of a liquid alkali metal and a liquid alkaline earth metal as in the instant claim 10.

Armstrong et al. ('106) discloses a method of producing a non-metal element or a metal or an alloy thereof from a halide or mixtures thereof (abstract).

One of ordinary skill in the art would expect that when a metal halide is reduced, the metal in its gaseous form would be present in the vapor phase of the metal halide to be reduced. Therefore, examiner asserts in the absence of evidence to the contrary that using a metal halide implies using the metal in its gaseous form.

Armstrong et al. ('106) further discloses said method comprises providing a supply of halide vapor of the metal or non-metal or mixtures thereof, providing a supply of liquid alkali or alkaline earth metal or mixtures thereof, introducing the halide vapor submerged in the liquid alkali metal or alkaline earth metal or mixtures thereof at a velocity not less than the sonic velocity of the halide vapor to produce a powder of a non-metal or a metal or an alloy thereof and a halide of the alkali or alkaline earth metal by an exothermic reaction (claim 8). One of ordinary skill in the art would expect that the vapor phase of the metal or non-metal or mixtures metal is in contact with the liquid alkali or alkaline earth metal or mixtures during the reaction.

It would be obvious to one of ordinary skill in the art at the time the invention was made to use halides of the base iron metal and alloying elements and reduce them by the process as disclosed by Armstrong et al. ('106) in the process of JP '958 in order to reduce the cost and environmental impact of the process as disclosed by Armstrong et al. ('106) (col. 2, lines 34-53).

Due to the uncertainty of instant claim 13, there is no art rejection for claim 13.

***Double Patenting***

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5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).



Claims 1-4 and 6-9 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-4, 5, 11, 12 and 13 of U.S. Patent No. 6,926, 754 B2.

Although the conflicting claims are not all identical, they are not patentably distinct from each other because:

With respect to instant claim 1, claim 1 of '754 B2 discloses a substantially similar process.

The instant claim 1 discloses a method for preparing an article of iron base metal alloyed with an alloying element, while '754 B2 claim 1 discloses a method for preparing an article of a base metal wherein the base metal is selected from a group consisting of nickel, cobalt, iron, iron-nickel and iron-nickel-cobalt (claim 1) alloyed with an alloying element. The two methods comprise identical steps. Examiner asserts that instant claim 1 would be in the scope of claim 1 of '754 B2.

With respect to instant claims 2-4, 6-9, they are identical to the claims 2-4, 5, 11, 12 and 13 of '754 B2 respectively.

Claims 14-20 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 14-19 of U.S. Patent No. 6,926, 754 B2 respectively in view of Martensite and Martensitic Phase Transformation, University of Cambridge, <http://www.msm.cam.ac.uk/phase-trans/2000/C9/lectures45.pdf>, 1<sup>st</sup> paragraph, page 1 ('UOC).

The instant claim 14 is identical to the instant claim 1 except for one additional step to prepare an article made of iron base alloyed with an alloying element – post-

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processing the consolidated metallic article by heat-treating the consolidated metallic article to form a martensitic steel. However, this would have been obvious to one of ordinary skill in the art at the time the instant invention was made to heat-treat the consolidated iron based metallic article in claim 1 of '754 B2 in order to form a martensitic steel with an outstanding combination of strength and toughness for the article as disclosed by 'UOC.

With respect to instant claim 20, it is identical to the claim 19 of '754 B2.

With respect to instant claims 15-19, they are substantially similar to the claims 14-18 of '754 B2 respectively.

Claims 5, 11 and 12 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of '754 B2 in view of JP '958.

JP '958 is further applied to the claimed limitations in the instant claims 5, 11 and 12 for the same reasons as disclosed above.

Claim 10 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of '754 B2 in view of JP '958 and further in view of Armstrong et al. ('106).

JP '958 in view of Armstrong et al. ('106) is further applied to the instant claim 10 for the same reasons as disclosed above.

Claims 21-23 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of '754 B2 in view of UOC and further in view of JP '958.

JP '958 is further applied to the claimed limitations in the instant claims 21-23 for the same reasons as disclosed above.

**Conclusion**

6. This Office action is made non-final. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Weiping Zhu whose telephone number is 571-272-6725. The examiner can normally be reached on 8:30-16:30 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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